

Research Article

Development of employment indicators to advance the quality of spinal cord injury rehabilitation care: SCI-High Project

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Context: Employment and Return to Work (RTW) rates following spinal cord injury/disease (SCI/D) are low due to individual and impairments characteristics, secondary health conditions, social and environmental barriers, prior work experience, workplace supports and resources, and physical or psychosocial work demands. To improve RTW, the SCI-High Project team developed a set of Employment structure, process, and outcome indicators for adults with SCI/D in the first 18 months after rehabilitation admission.

Methods: A pan-Canadian Working Group of diverse stakeholders: (1) defined the Employment construct; (2) conducted a systematic search of available outcomes measures; (3) constructed a Driver diagram summarizing factors associated with employment. Subsequent facilitated meetings allowed for the creation of structure and process indicators, and the selection of outcome indicators.

Results: The structure indicator is the proportion of SCI/D rehabilitation programs with an employment resource center. The process indicator is the proportion of SCI/D rehabilitation inpatients who receive an employment assessment during inpatient rehabilitation. The intermediary and final outcome measures are the Readiness for Return-to-Work Scale (RRTW) and Work Productivity and Activity Impairment (WPAI). Scale A of the RRTW for those who are unemployed and Scale B of RRTW and WPAI will be used for those who are employed.

Conclusion: This framework of Employment indicators intends to support the RTW needs of persons with SCI/D by ensuring that rehabilitation professionals provide opportunities to explore RTW within the first 18 months after rehab admission. Increased employment rates have the potential to enhance the wellbeing, health, and longevity of individuals with SCI/D.

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Introduction

In the field of spinal cord injury or disease (SCI/D) rehabilitation, employment outcomes are frequently measured as an indicator of success for community integration.¹ Contrary to advances in technology and increasing opportunities for remote work from home for individuals with disability,² employment rates after SCI in the US are estimated to be about only 12% at one-year post-injury.³ Further, the Praxis Spinal Cord Institute, a Canadian-based SCI Research Institute, recently reported that 34% of Canadians who were employed at the time of SCI/D onset were unemployed at five years thereafter, and 27% of those unemployed at SCI/D onset, remain unemployed at five years post-injury. The employment rate post-injury among individuals with SCI in Canada is 32- 38%, which declines dramatically from the 62% working before their injury.^{4,5}

In individuals with SCI/D who wish to return to work, work disability and unemployment can negatively impact their household income,⁶ life satisfaction,⁷ and overall health. According to Krause *et al.*,⁸ the odds of mortality was 61% higher among traumatic SCI individuals with an income between \$25,000 and \$75,000 USD compared to those with a household income of \$75,000 USD or greater. Therefore, participation in paid work is considered an essential means of reducing mortality, and enhancing social determinants of health and community participation among adults with SCI/D.⁹⁻¹¹

The workers' perceptions of Return-to-Work (RTW) are associated with back to work and future work participation.¹² RTW is defined as, "a health-related behaviour involving motivation and self-management, influenced by physical and psychological work-related factors".¹³ RTW following SCI/D is a biopsychosocial process associated with a range of barriers and facilitators including personal factors (e.g. age, sex, race, injury level and severity, time since injury and prior work experience), work attitude, available supports and resources, and work context factors (e.g. job type, physical and psychosocial job demands).¹⁴⁻¹⁷ For example, an individual who is male, younger age at injury onset, with a higher level of education and functional independence will have a greater likelihood of RTW after SCI/D.¹⁸ Entering the workforce after SCI/D is a complex process and typically lasting 4.9 years, with a range of three months to 20 years.^{1,19} Frequently reported barriers to employment among individuals with SCI/D are transportation to and from work,

physical limitations, insufficient education or vocational rehabilitation (VR), architectural barriers, financial disincentives, employers' attitudes, social support, marital status, and financial disincentives, including disability benefits.^{9,14-16,20} Evidently, for individuals with SCI/D who are employed with appropriate work accommodations in place, the majority are able to sustain productive employment.²¹ Appropriate work accommodations may include job adaptations and workplace support such as decreased work hours and providing physical access to the workplace.

Motivational factors contributing to RTW behavior and maintenance of work participation following injury or illness are addressed in the Readiness for RTW (RRTW) model.²² The RRTW model contains five proposed changes related to RTW including Pre-contemplation, Contemplation, Preparation-for-Action, Action, and Maintenance. In the "Pre-contemplation" stage, one is not yet considering RTW or engaging in actions to facilitate RTW. Individuals in the "Contemplation" stage are starting to consider RTW by contemplating its pros and cons, but are not yet making firm plans for RTW. The third stage is "Preparation for action – self-evaluative," in which the individual makes definite plans to RTW, tests their ability to RTW, and seeks the necessary information. In the "Preparation for action-behaviour stage", the individual moves from setting plans to implementing them into action and is motivated to initiate and maintain RTW. In stage five, "Uncertain Maintenance," the individual uses self-management skills and strategies to identify and cope with circumstances that may lead to an increased risk of sickness absence relapse. Finally, in the "Proactive Maintenance" stage, the working individual's self-efficacy increases as they maintain at work.

There are 11 key factors associated with employability among individuals with SCI/D, including employment type before the injury, disability severity, age, time since injury, sex, marital status and social support, vocational counseling, secondary health complications, employer role, environment, and professional interests.²³ Aside from the employment barriers attributable to their disability, individuals with SCI/D are often required to consider and/or start a new occupation, which requires VR or learning new skills. Success or failure to acquire these qualifications or complete vocational retraining can lead to upward or downward social mobility.²³ Employment

services which can mediate barriers to employment include: job search, networking, services to match job requirements with the individual's functional level, job application skills, and job interview preparation.²⁴

VR aims to help individuals with SCI/D return to productive employment and promote workforce participation. VR involves a multidisciplinary approach that includes vocational counseling and training, and job placement to optimize employment.^{25,26} Within the Canadian context, provincial and federal policies related to employment mandate reasonable accommodations and prohibit discrimination against people with disability, such as SCI/D.²⁷ Further, the Accessible Canada Act (2021) was legislated to remove all barriers to employment within the federal government and federally regulated organizations. Despite this important initiative, there are residual disparities regarding the type of VR facilities and the processes for preparing individuals for RTW among Canadian tertiary SCI rehabilitation centers.

Although, we can identify factors that determine work participation, we do not yet know how to address these factors within a SCI/D rehabilitation context to ensure RTW. RTW among people with disabilities, including individuals with SCI/D, necessitates a multidisciplinary and interprofessional approach. To find appropriate work for individuals with SCI/D, the impact of governmental and insurance agency policies and employers' attitudes should be taken into account. Federal and provincial governments have endeavored to educate employers in order to reduce obstacles to the employment of people with disabilities. However, people with disabilities face non-accommodating environments, inadequate income support, lack of opportunities and little political influence, resulting from an inequitable distribution of societal resources. Joint efforts of the disability organizations, rehabilitation centers, ministry of labor, municipal, provincial and federal policymakers, and the Canada pension plan are likely to have the most impact on legislative changes.²⁸

Implementation of quality indicators in an iterative manner can enable learning within the health system. Indicators are measures intended to inform how well a health system performs in terms of structures and processes of care, and provides insight into the associated patient outcomes. Structure indicators are defined by the properties of the setting in which the health care services occur^{29,30} while process indicators describe the specific activities in providing and receiving of care.³¹ Finally, outcome indicators evaluate health improvements (or deterioration) that can be attributed to the

health care or therapy provided, such as mortality, morbidity, health status, health-related quality of life, patient/family/provider satisfaction, employment and functional ability.³¹

The SCI Rehabilitation Care High-Performance Indicators (SCI-High Project) is a pan-Canadian project to develop/select, implement, and evaluate consensus-derived quality of care indicators for 11 domains of rehabilitation prioritized by clinicians, researchers and individuals living with chronic SCI/D.³² This manuscript describes the processes involved in the conception and development of the structure, process, and outcome indicators related to Employment within the Community participation Domain, among individuals with SCI/D admitted to tertiary SCI rehabilitation centers from the time of rehabilitation admission to 18 months, thereafter.

Methods

A detailed description of the overall SCI-High Project methods and processes for prioritizing Employment in association with the Community Participation Domain of SCI rehabilitation care are described elsewhere.^{32,33} In addition to the SCI-High investigative team (www.sci-high.ca), an external advisory committee (EDC) and national data strategy committee supported the overall project goals including providing oversight related to the context for implementing all of the project indicators. The SCI-High Project Team leaders led a discussion to achieve consensus as to the most important SCI-Care Domains. Then, using a modified Hanlon Method scoring system and the individual External Advisory Committee (EAC) members' opinion, 15 SCI/D domains were prioritized.³⁴ Based on this process, the employment domain was ranked the seventh important domain in SCI/D rehab care. Considering the high correlation between Community Participation and Employment Domains, the EAC and project leaders decided to combine these two domains into one single domain.

The approach to developing the Employment structure, process and outcome indicators followed a slightly modified version of the processes described by Mainz,²⁹ which included the following planning and development phases: (a) formation and organization of the national and local Working Groups; (b) defining and refining the key sub-Domain and specific target construct; (c) providing an overview/summary of existing evidence and practice; (d) developing and interpreting a Driver diagram; and (e) selecting indicators; and (f) refinement of the employment structure, process and outcome indicators. Throughout this process, a

facilitated discussion occurred amongst the Working Group and the SCI-High Project Team to utilize relevant expertise in the area of employment, while ensuring the broader goals of the SCI-High Project were aligned across the other Domain Working Groups. In the occasions where there were disagreements, the Project Leaders used the modified Delphi consensus process to identify challenges, strengths and feasibility of the proposed indicators.

Working group

Development of the Employment indicators described herein was embedded in the work of the Community Participation Domain.³⁵ Experts in employment and community participation and relevant stakeholders were invited to participate in the SCI-High Project as members of the Domain-specific Working Group based on their practical or empirical knowledge of SCI/D rehabilitation, community participation, employment, and health service delivery. The group was composed of psychiatrists, rehabilitation scientists, behavioral scientists, occupational and physical therapists, epidemiologists, postdoctoral fellows, an Employment resource center manager and a scientist from the Institute of Work and Health. All individuals had substantial content expertise and working knowledge in the field of SCI rehabilitation and employment. The Working Group met on nine occasions via video-conference, totaling nine hours of discussion related to the conception and development of the indicators and manuscript preparation. Regarding consensus approach, outside of formal meetings, individual Working Group members conducted reviews of the prepared materials, and shared resources and/or practice standards with one another.

Systematic search and driver diagram

Employment, paid or unpaid, is the most substantial independent factor associated with community participation.³⁶ Selection of Community Participation Domain as a domain of interest for developing employment indicators emerged from a consensus-building activity to select the broader set of domains pursued within the overarching SCI-High Project.³⁵ The Employment indicators described herein are intended to become a subset of the Community Participation Domain.³⁵

The indicator development process involved a systematic search and collecting information about SCI/D rehabilitation care related to employment and RTW, identifying factors that influence the outcome of rehabilitation interventions and a scoping synthesis

of the acquired data. MEDLINE, EMBASE and CINAHL databases were searched using the terms “employment,” “return to work,” “RTW,” “spinal cord injury,” and combinations of these words. The Systematic search of the literature was done to gain insight into all impacting factors and determinants of employment and RTW. The search results were used to help the Employment working groups select the most important drivers in the driver diagram and inform the selection of the best outcome indicators for this domain. All findings of the systematic search were summarized in the Driver diagram and the table of outcome measures. The Driver diagram was extensively discussed and later refined by the Working Group based on an agglomeration of their expertise, the search results and the group consensus. This information was used to create a Driver diagram to illustrate known drivers that impact employment among individuals with SCI/D (Fig. 1).¹⁴ A Driver diagram displays a high-level quality improvement goal and a set of underpinning aspects.³⁷ The tool helped organize change concepts as the Working Group discerned “what changes can we make that will result in goal attainment.” The Community Participation Domain³⁵ working group’s Driver Diagrams for participation and employment were developed in concert with one another due to the overlap of key constructs.

Selection of indicators

The Working Group was asked to develop/select at least one indicator each for structure, process and outcome that would improve employment for individuals with SCI/D within the Community Participation Domain. The Project Leaders stipulated that the indicators should be relevant, concise and feasible to implement nationally (10 min or less), and aligned across the structure, process and outcome to achieve a single substantive advance in SCI/D rehabilitation care. Ideally, the indicators could be measured using established or new measurement tools (*i.e.* questionnaires, data collection sheets, laboratory exams, and medical record data), depending on the requirements and feasibility of a given indicator.

Results

Construct definition

Based on the group discussions regarding the community participation and employment constructs, and reflections upon current terminology, the following construct definition for the employment element of the Community Participation Domain was developed:

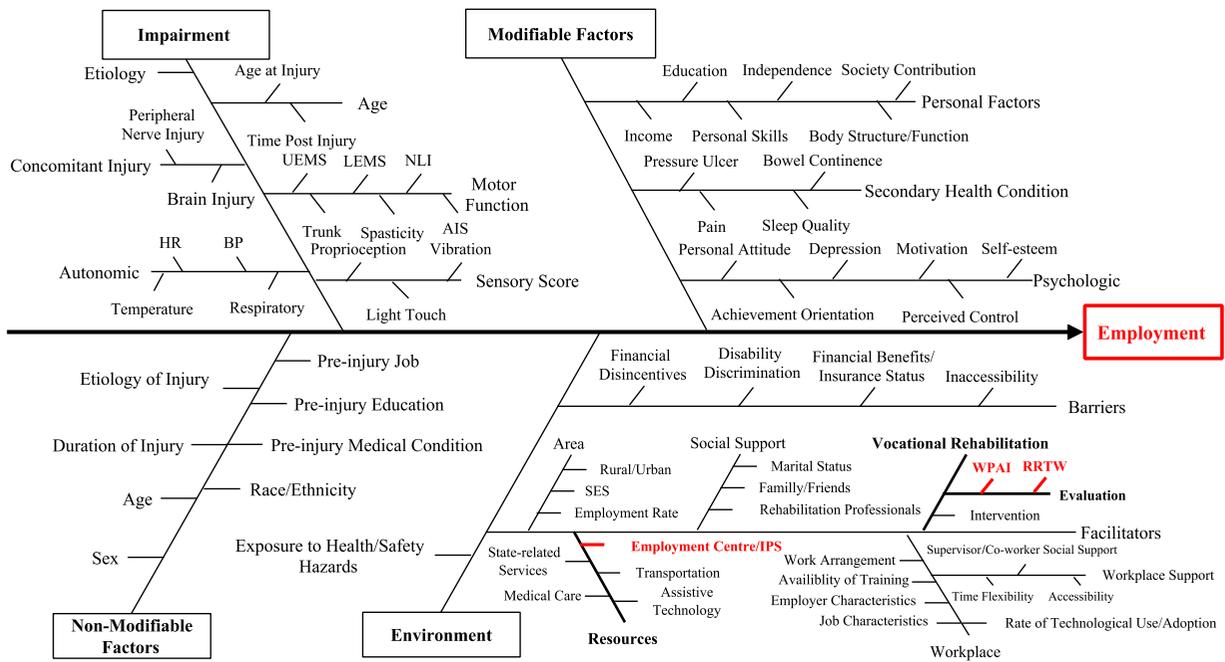


Figure 1 Employment driver diagram. The impairment branch is common to the 11 SCI-High Project domains. UEMS: Upper-Extremity Motor Score; LEMS: Lower-Extremity Motor Score; NLI: Neurological Level of Injury; AIS: ASIA Impairment Scale; HR: Heart Rate, BP: Blood Pressure; sES: Socioeconomic Status; WPAI: Work Productivity & Activity Impairment; RRTW: Readiness for Return-To-Work IPS: Individual Placement and Support

“Employment is a critical social and economic determinant to Canadians’ health, life expectancy, and quality of life among individuals with spinal cord injury/disease (SCI/D) and a crucial rehabilitation outcome”. Employment is defined as, “the performance of activities that enable involvement in vocational roles and are related to the generation of income or other benefits”.³⁸

Figure 1 shows the Driver diagram for the Employment Domain among individuals with SCI/D. The impairment branch of the Driver diagram is common to all 11 Domains.

The branches in red within the Driver diagram represent the main areas that were the focus for the development of indicators based on the group’s expert opinions.

Indicator development

The selection and refinement of structure, process and outcome indicators for employment were primarily driven by the structure indicator and impetus to promote RTW after discharge from tertiary rehabilitation centers. The structure indicator was defined as Proportion of SCI/D rehabilitation programs with an available Employment Resource Centre. An Employment Resource Centre is a facility which provides assessment, counseling and career alternatives for individuals with SCI/D unable to return to their

former employment. Individuals are provided with strategic advice and assistance for people with disabilities to increase the likelihood of retraining for a new career or obtaining employment. Additional services may include access to computers, Internet, fax, photocopier and telephone, resource materials, job boards and labor market information, workshops, assistance with resume preparation, career counseling, job placement, employment mentoring, assistive technology assessment and training and integrated adaptive technology to accommodate their disability (<http://cis.pointinc.org/node/366>). An equivalent term used in the US is a “career counselling centre” or an “outplacement centre.”

The Employment process indicator is the proportion of SCI/D rehabilitation inpatients who receive an employment assessment (Table 1). The choice of outcome indicators was informed by the search for relevant employment outcomes suitable for implementation (Table 2). Nine outcome indicators were identified and considered for implementation as the intermediary or final outcome indicators. The focus on the RTW construct resulted in selection of the RRTW and the Work Productivity Activity Impairment inventory as the intermediary and/or final outcome indicators (Table 3).

Regarding the outcome indicator, the working group decided to use two valid and reliable tools to measure

Table 1 Vocational rehabilitation activities adapted from Ottomanelli et al.⁵⁹.

Time	Type of Vocational Service Activity	Definition	Service Availability
Inpatient Rehabilitation	Orientation	Provide SCI/D Patients with an understanding of how vocational Rehabilitation services work and what supports the vocational rehabilitation counselor will provide	Yes No
	Assessment	Ongoing assessment process that defines the employment status and the stage of readiness for RTW for people who are planning to work	Yes No
	Treatment plan development	Integrate the information gained in the orientation, and assessment session, into the primary clinical team treatment plan for RTW	Yes No
	Referrals for collateral services	Refer to non-integrated, clinical team programs to address job skills training and placement	Yes No
Following Rehabilitation Discharge	Job skills training or education	Provide services, supports, training programs, and/or referrals to other intervention rehabilitation programs that are intended to get the SCI/D patients ready to go to work versus direct job placement with support	Yes No
	Job development	Employer networking and negotiation based on the SCI/D Patients' interests and preferences	Yes No
	Vocational counseling	Provide office-based or telephone guidance to the SCI/D on how to get and keep jobs; sometimes including interview and interpersonal skills training	Yes No
	Worksite accommodation	Provide information, resources, equipment, or modifications to aid productivity, and determination of supports necessary to secure employment, e.g. schedules, workspace, equipment, personnel support	Yes No
	Job placement	Advocacy, actions, and negotiations with personnel in the employment setting to secure the job and make arrangements for the SCI/D to start the job to start the job	Yes No
	Vocational case management and social skills training	Actions and supports specific to the SCI/D patient's job development preferences intended to enhance employability, e.g. advocate with family or community resources to assist with transportation to and from work	Yes No
	Employment supports and job coaching	Training and support in the workplace to improve the SCI/D's comfort, mobility, relationships, personal care, and overall work function	Yes No
	Treatment plan review and revision	Return to the employment and treatment plan to update and reflect on better strategies to attain the stated goal of job placement or retention support	Yes No
	Employment follow-up	Support to both the SCI/D patients and employer/co-workers to safeguard SCI/D patients' productivity, safety, and satisfaction in addition to employer's satisfaction	Yes No

the employment situation of SCI/D after discharge from a tertiary SCI rehabilitation center. The Readiness for Return-To-Work (RRTW) (Appendix 1) was determined as the intermediary outcome and will be used two weeks prior to rehabilitation discharge and 18 months (+/- 1month) after admission. The RRTW scale was developed and validated in a Canadian cohort study.³⁹ The scale is divided into two subscales. Scale A with 13 items is intended for individuals who are not working, and scale B, which has nine items, is intended for use among individuals who are working (full or part-time). There are five response options which include a Likert scale from strongly disagree (scored 1) to strongly disagree (scored 5) for each item. After scoring, the item-specific sub-scores are summed to determine the total score for each subscale to identify the stage for RTW.

The psychometric properties of the RRTW scale have not been determined for RTW among individuals with SCI/D. The RRTW has good internal consistency in a Canadian sample with musculoskeletal disorders, whereby the generated Cronbach's alphas were satisfactory ($> = 0.7$), except for proactive work maintenance, which was 0.59.⁴⁰ Identifying which stage individuals with SCI/D are in concerning RTW will support the rehabilitation personnel's selection of practical and individually tailored interventions.

Other models such as self-efficacy at work and effort-reward imbalance model were discussed. These models are specifically for people who are working or in RRTW stage B. The Effort-reward imbalance model is a stress model which measures psychosocial factors in the working world.⁴¹⁻⁴³ The primary initial concern for individuals with SCI/D is RTW. Thus, the

Table 2 Outcomes measures considered for inclusion in the employment indicators.

Measurement Tool	Tool Description	Items & Scoring
Effort Reward Imbalance (ERI) ⁶⁰	A standardized, self-report measure for imbalance between work effort and reward <ul style="list-style-type: none"> • Long form has adequate validity • For individuals who are currently working 	<ul style="list-style-type: none"> • Long form: 22 items • Short form: 16 items
Readiness for Return-to-Work Scale (RRTW) ³⁹	<ul style="list-style-type: none"> • In Scale A that assesses stages of readiness for RTW, two factors are identified: (1) The RTW inability factor includes items 1, 2, 4, 5 and 13. Persons scoring high on the inability to RTW factor are not considering start of activity or RTW-related behavior. (2) The RTW uncertainty factor includes items 10, 11 and 12. Persons scoring high on the RTW uncertainty factor are considering RTW, but they are uncertain about their possibilities in relation to health and their ability to return to work. • In Scale B that assesses stages of readiness for work maintenance, we have also identified two factors: (1) Proactive work maintenance includes items 2, 4 and 9. Persons scoring high on this factor have found strategies to manage work and need less help to stay at work. (2) Uncertain work maintenance includes items 1, 3, 5, 6, 7. Persons scoring high on this factor have a high degree of uncertainty about their ability to continue working. 	<ul style="list-style-type: none"> • 22-items -13 items for persons not working (Scale A), and 9 items for persons working part time or full-time (Scale B). • Five-point ordinal scale (1 = strongly disagree, 5 = strongly agree)
Return-to-Work Self-Efficacy Scale (RTWSE) ⁶¹	<ul style="list-style-type: none"> • Three subdomains: (1) the RTWSE Pain subscale, <i>i.e.</i> the ability to cope with pain (pain-tolerate, pain-prevent, pain manage), (2) the RTWSE Supervisor subscale, <i>i.e.</i> the ability to obtain help from supervisor and (3) the RTWSE Co-workers subscale, <i>i.e.</i> the ability to obtain help from coworkers. 	<ul style="list-style-type: none"> • Original: 28 Items • Other version: 19, 11, 10 Items • Five-point scale (0 = not at all certain, 4 = completely certain). The higher the score on the Self-efficacy for RTW Scale, the higher someone's self-efficacy.
Rheumatoid Arthritis Specific Work Productivity Survey (WPS-RA) ⁶²	<ul style="list-style-type: none"> • Disease-specific questionnaire • Assessing the impact of RA on productivity within and outside the home and daily activities during the preceding month. • One item of the WPS-RA addresses current labor market participation (that is, "are you currently employed outside the home?"). 	
Workplace Activity Limitations Scale (WALS) ^{62,63}	<ul style="list-style-type: none"> • Assesses disability/ activity limitation in the workplace due to physical illness • Arthritis-related employment activity • The scale measures the degree of difficulty with various job-related tasks that tax upper and/or lower limb function (e.g. gripping, crouching), as well as difficulties with commuting, scheduling, concentration, and pace of work. 	<ul style="list-style-type: none"> • 12 items • 4-point Likert type scale range from 0 to 3, where 0 = no difficulty and 3 = not able to do. If the item was not applicable, a score of 0 was given.
Work Instability Scale for Rheumatoid Arthritis (RA-WIS) ⁶⁴	<ul style="list-style-type: none"> • Disease-specific questionnaire • Predicts RTW within 1 year among patients with RA • Predicts SAW • Shows effectiveness of occupational therapy among patients with Rheumatoid Arthritis 	

Continued

Table 2 Continued

Measurement Tool	Tool Description	Items & Scoring
Work Limitations Questionnaire (WLQ-25 /WLQ-16 /WLQ-8) ⁶⁵	<ul style="list-style-type: none"> • Job impact of chronic health conditions & treatment • A range of chronic conditions, including depression, arthritis, cancer, heart disease, diabetes, asthma, musculoskeletal pain, skin conditions and insomnia 	<ul style="list-style-type: none"> • Organized into 4 domains: <ul style="list-style-type: none"> ○ Time management (TM), addresses difficulty with handling a job's time and scheduling demands (5 items) ○ Physical demands (PD), examines ability to perform job tasks that involve bodily strength, movement, endurance, coordination, and flexibility (6 items) ○ Mental-interpersonal demands (MI), addresses cognitively demanding tasks and on-the-job social interactions (9 items) ○ Output demands (OD), concerns reduced work productivity (5 items)
Work Role Functioning Questionnaire (WRFQ) ^{64,66,67}	<ul style="list-style-type: none"> • A variant of the WLQ and is a work disability measure assesses the degree to which a working individual is experiencing on-the-job limitations* due to his/her health problem. • Self-administered (telephone version available) • A Describing a number of work demands chosen because of their frequent occurrence in a variety of jobs and their importance identified from the worker's perspective. • Five scales: (1) Work Scheduling Demands, (2) Physical Demands, (3) Mental Demands, (4) Social Demands and (5) Output Demands. • Measuring the amount of time, in the past four weeks, a health problem interfered with the ability to perform work demands. • Each scale is scored separately, by adding the response of each item, and is mathematically converted to a score varying from 0 (limited all the time) to 100 (never limited). 	<ul style="list-style-type: none"> • 27 items • Five-level scale: 0=difficult all the time, 1= difficult most of the time, 2=difficult half of the time, 3=difficult some of the time and 4=difficult none of the time. Percentage of time anchors the scale at 0, 2 and 4 (100%, 50%, 0%) respectively. The category "does not apply to my job" is also added to the questionnaire to make it applicable to all kinds of jobs.
Work Productivity and Activity Impairment Questionnaire (WPAI) ⁴⁵	<ul style="list-style-type: none"> • Two versions: <ul style="list-style-type: none"> ○ General health (WPAI:GH) ○ Specific health problem (WPAI:SHP) • (WPAI: SHP) is designed such that it can be modified for any health problem by specifying the disease/condition of interest in the questions • Examines the extent of absenteeism, presenteeism, and impairment in daily activities attributable to general health (WPAI: GH) or a specific health problem (WPAI: SHP). 	<ul style="list-style-type: none"> • Six questions each with unique response options: Q1= current employment status (yes/no), Q2 = number of hours missed due to health problem, Q3 = number of hours missed due to other reasons, Q4= hours actually worked, (Q2-Q4: number of hours (count data)), Q5=degree to which health affected productivity while working(global rating scale, 0-10 (0_ health problems had no effect on my work, 10_ health problems completely prevented me from working)), Q6 = degree to which health affected regular (non-work) activities (global rating scale, 0-10 (0: health problems had no effect on my daily activities, 10: health problems completely prevented me from doing my daily activities)). • Items are not intended to be summative • http://www.reillyassociates.net/WPAI_GH.html

Employment Working group select the RTW as the primary outcome indicator, covering both unemployed and employed individuals. Scale A of the RRTW will be used for individuals who are unemployed and Scale B for those individuals who are employed.

Principles of VR should be incorporated into rehabilitation programs intended to improve employment

outcomes in persons with SCI/D. Appropriate VR could be defined based on the individual's RRTW Scale -A or B. For example, among individuals who are not employed (stage A), the appropriate interventions may include career counseling, skills training, and job placement, considering the job seekers' preference.⁴⁴ In contrast, for individuals at RRTW stage B

Table 3 Selected structure, process and outcome indicators for the employment domain.

Indicator	Denominator	Indicator Type	Time of Measurement
Proportion of SCI/D rehabilitation programs with available employment resource center	Total number of tertiary SCI/D rehabilitation programs in Canada	Structure	Annual
Proportion of SCI/D rehabilitation inpatients who receive employment assessment/consultation	Total number of SCI/D patients	Process	Rehabilitation Discharge
Readiness for Return-to-Work Scale (RRTW)	Total number of SCI/D patients	Outcome – Intermediary	Prior to rehabilitation discharge
Readiness for Return-to-Work Scale (RRTW)	Total number of SCI/D patients	Outcome – Final	18 months post rehabilitation admission
Work Productivity and Activity Impairment (WPAI) *for those who are employed*	Total number of employed SCI/D patients	Outcome – Final	18 months post rehabilitation admission

who are employed, the best VR might include interventions that address workplace adjustments such as work accommodations, psychosocial aspects of the workplace culture, removing physical barriers in the work environment (e.g. workstation or facilities), or addressing work self-efficacy and effort-reward imbalance models. The Work Productivity and Activity Impairment (WPAI) scale was selected as the final outcome indicator for individuals with SCI/D who are successful in RTW after 18 months from admission (Appendix 2). The WPAI is a validated tool that has been used more frequently than any other metric of productivity across various occupations and disability groups.^{45–48} Specific impairment metrics for work productivity include absenteeism (work time missed due to health problems), presenteeism (impairment at work/reduced on-the-job effectiveness), and overall work productivity loss (a combination of absenteeism and presenteeism). Lost work productivity measures can be assessed only for respondents who are employed. Activity impairment is a single measure of impairment due to health assessed for all respondents.

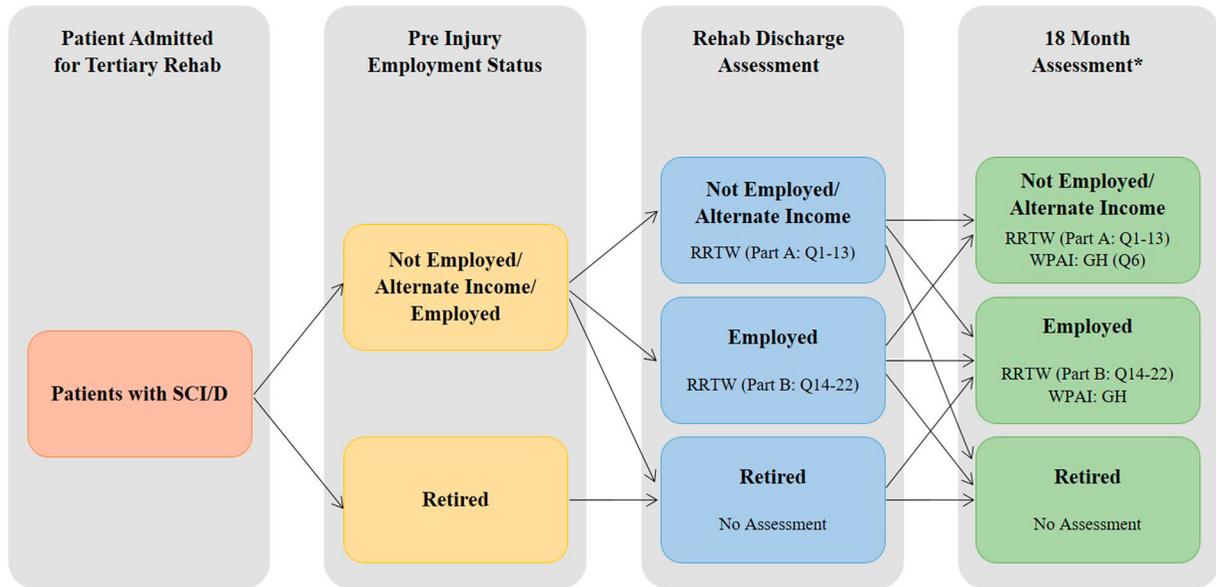
The four WPAI metrics are expressed as impairment percentages, with higher values indicating a greater proportion of impairment in work (less productivity) or activities. There are two forms of the WPAI. The

WPAI-GH (WPAI- General Health) consists of six questions using a 0–10 Visual Analogue Scale (VAS) and a recall period of seven days.⁴⁸ Four main outcomes can be calculated from the WPAI-GH, and displayed in percentages by multiplying the corresponding scores by 100, which are: (1) percent work time missed due to health = $Q2/(Q2 + Q4)$ for those who are currently employed; (2) impairment percentage while working due to health = $Q5/10$ for those who are currently employed and worked in the past seven days; (3) overall work impairment percentage due to health ($Q2/(Q2 + Q4) + ((Q1 - Q2/(Q2 + Q4)) \times (Q5/10))$) for those who were currently employed; (4) Activity impairment percent due to health ($Q6/10$) for all respondents.⁴⁸

For those who were absent from work or did not work in the seven days prior to the assessment, the overall work impairment percentage due to health will be equal to the percentage of work time missed. Figure 2 is a decision tool developed by the working group to assist clinicians in selecting the most appropriate intermediary and long-term outcome indicator(s) based on the individuals' employment status at admission and stages of RTW during and after admission.

Discussion

Employment is an important social determinant to health for people with SCI/D that requires considerable attention and early intervention within tertiary SCI/D rehabilitation settings. It is well recognized in the disability community that employment and community participation are overlapping constructs, readers are encouraged to review the related manuscript on community participation indicators³⁵ in this issue. Unfortunately, there is little information regarding appropriate indicators to guide RTW in these settings. However, the selected employment indicators provide insights from a transdisciplinary team of stakeholders. Indeed, they are intended to promote proliferation of VR and documentation of employment status and assessment of RTW readiness within rehabilitation programs; and follow individuals with SCI/D after assessment to determine their success in obtaining competitive employment at 18 months post-rehabilitation admission. For individuals who have been unsuccessful in finding a suitable job, the VR interventions could be designed to address the individual's needs based on the RRTW results. In addition to the individualized interventions, based on the outcome indicator results, improvements in the structure and process indicators are intended to promote employment among individuals with SCI/D.



RRTW: The Readiness for Return-To-Work Scale; SCI/D: Spinal Cord Injury/Disease; WPAI: GH: Work Productivity and Activity Impairment Questionnaire: General Health V2.0.

*18 month assessment is conducted at 18 months (+/- 1 month) following the date of rehabilitation admission.

Figure 2 SCI-High employment domain indicator decision tree. Appropriate indicator data collection is based on the patient’s employment status at the time of assessment.

Based on available evidence and expert opinion, the selected indicators were deemed to be feasible, clinically relevant and likely to have an impact on employment among individuals with SCI/D following inpatient rehabilitation.

The structure indicator was defined as the proportion of SCI/D rehabilitation programs with an available employment resource center with VR services. VR does not conventionally fall within the health portfolio and the availability of VR varies across Canada, although ironically, employment is an important driver of health status. Strong evidence indicating the importance of having access to VR services in promoting RTW⁴⁹ was the primary rationale for the selection of the structure indicator. VR that provides information about employment opportunities, education and training prerequisites, can help to facilitate vocational decision-making among patients with SCI/D;⁵⁰ and promote community participation to obtain employment. Individualized placement and support and vocational resource facilitation are examples of interventions that integrate VR services with clinical care to help persons with SCI/D find employment.⁵¹ In Canada, Ontario’s Government is moving ahead with the reform of the employment services system by introducing new Service System Managers in three prototype regions across Ontario. This approach will create an efficient employment

service to meet the needs of all clients, including those on social assistance or with a disability, be more responsive to local labor market needs and drive results for job seekers, employers and communities. Employment Services at Spinal Cord Injury Ontario (SCIO) supports clients looking for employment in Toronto. Clients from both Employment Ontario and ODSP are eligible for services and need to self-disclose that they have a disability to receive service. SCIO specializes in serving people with an SCI and also provides service to anyone who has a disability. Clients receive support from an Employment Counselor and a Job Developer to meet their employment goals and access various virtual workshops that assist in the job readiness process. SCIO created a business case outlining their value in the revised approach to meeting the employment needs of people with an SCI (<https://sciontario.org/>).

The choice of process indicator was driven by the uncertainty, controversy and clinical equipoise regarding what is the most appropriate employment process indicator. Equipoise regarding what constitutes an optimal assessment are in part driven by the diversity of rehabilitation professionals at each site and the limited portion of their role dedicated to promoting employment.²⁷ The Working Group planned to ask sites reporting the process indicator to report annually the content of their employment assessment with the

intent to enable retrospective identification of the employment assessments and 18 month post admission employment outcomes.⁵²

Selection of the RRTW questionnaire, was based on the “Stages of Change” model, which is considered beneficial in occupational health research for facilitating the development of interventions tailored to the specific needs of workers during the lengthy the RTW process.³⁹ For example, a person in an early stage of RTW who is uncertain about participation in the workforce may benefit from exploring the pros and cons of work participation. On the other hand, this same individual may benefit from a structured plan for a graded RTW with work accommodations at a later RRTW stage.²² Therefore, using RRTW as an intermediary indicator should guide members of the rehabilitation team in using the RRTW result to guide selection of the optimal time to introduce vocational interventions for individuals with SCI/D regardless of the setting. The time duration between rehabilitation discharge and RTW will vary between individuals. Therefore, we are planning to measure how many individuals with SCI/D RTW and are eligible for indicator completion at 18 months after rehabilitation admission, which will serve as a proxy for VR’s effectiveness at different sites. At 18 months post-rehabilitation admission, Individuals with SCI in Canada have typically completed their inpatient rehabilitation length of stay and have been discharged from the day-hospital or outpatient rehabilitation program. This point in time (18 months post-rehab admission) was chosen as a time point for the assessment of patient outcomes in the community in order to understand how the processes or rehabilitation influence downstream outcomes.

To understand the relationships between health and RTW, the Working Group decided to use WPAI as the final indicator for the patients with SCI/D who return to work. The WPAI questionnaire is a useful tool for comparing work impairments between subjects with different levels of disease severity. However, the validation of this instrument among individuals with SCI/D has not yet been established. Therefore, we do not know if individuals with SCI/D have a higher impact on presenteeism and productivity than other disability groups. Future concurrent validation of the WPAI with indicator data collection among individuals with SCI/D is planned.

Additional employment challenges and opportunities

Even after RTW, individuals with SCI/D may still have problems in the workplace, which is highly correlated

with their job.²³ For example, individuals with SCI/D may have productivity loss due to their disability while at work due to secondary health conditions.⁵³ The absence of workplace accommodation, access to appropriate assistive technology, and employers’ and co-workers’ misperceptions about an individual with SCI/D are also factors in staying unemployed.

The COVID-19 pandemic has disproportionately negatively affected vulnerable members of the labor market including people living with disabilities^{54,55} whom are:

- More likely to work in jobs with greater exposure to the virus and less likely to have the power or opportunities to adapt their working situation.
- Less likely to work from home (although we know this beneficial for people with disabilities).
- More likely to work precariously and be affected by economic shifts.
- Vulnerable to adverse mental health outcomes due to the absence of Personal Protective Equipment (PPE) and perceived risk of COVID.

The United Nations Convention on the Rights of Persons with Disabilities, (UNCRPD) with which Canada is a signatory, has aimed to remove all barriers to accessibility for people with disability in all areas of life. The recent passing of the ACA mandates the Canadian government’s commitment to the UNCRPD and steps are underway to implement the legislation within the federal government and crown corporations. There are a number of limitations of the ACA (e.g. reach) but it represents an important step forward in the commitment to making Canadian workplaces more accessible.

The advent of COVID-19 in March 2020 and with implementation of the new Canadian Accessibility Standards⁵⁶ in January of 2019 provides the Canadian rehabilitation community with a unique and compelling opportunity to accelerate meaningful opportunities for individuals with SCI/D to become employed, and work from home. COVID-19 has shifted the employment culture⁵⁷ regarding the ability of people to work effectively from home and for employers to understand the value of information technology (IT) accessibility standards. Recent Rick Hansen Spinal Cord Injury Registry data indicated a current employment rate of 31% one year after impairment onset among 735 Canadians with the highest employment rate among individuals with motor incomplete injury ASIA Impairment Scale (AIS) -D (43%), followed by those with motor complete injury AIS-A (20%).⁵⁸ Promoting employment that aligns with the new working world should be a VR goal that aligns with the indicators we plan to measure.

Some limitations are worthy of discussion prior to generalizing the Employment Domain indicators. First, the outcome measures have not been validated in the SCI/D population. The planned outcome measure data collection will drive the collection and later validation of the psychometric properties of RRTW and WPAI in the SCI/D population. Second, we used a limited group of experts; therefore, it is plausible that a different group of experts might select alternate indicators using the same construct. Measuring the psychometric properties of these tools will address this limitation. Finally, complex questionnaire calculations may reduce the validity of the results, especially for the WPAI, if an artificial intelligence solution for auto calculating the scores with a high degree of accuracy is not used.

The selected indicators will be integrated into the larger SCI-High Project framework to create a group of indicators for routine implementation within a single rehabilitation program with project-wide report cards enabling cross-site and cross-Domain comparisons of structure, process, and outcomes.

Conclusion

RTW, securing and sustaining employment after the onset of SCI/D are currently a complicated and drawn-out processes due to the lack of access to relevant VR, and job placement services. The selected Employment indicators will track, available employment structures affiliated with tertiary rehabilitation programs, facilitate documentation of the employment status of individuals with SCI/D at rehabilitation admission, and help to optimize work return through assessment and routine documentation of RRTW, with the aim of individualizing their employment interventions and ultimately improving employment rates at 18 months post rehabilitation admission for those individuals for whom employment is a feasible goal.

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Appendix 1. Readiness to Return to Work Scale

The following section is about your feelings about getting ready to return to work. Keep in mind that “back to work” could mean back to part-time or modified work.

Are you currently back at work?

Yes (complete items 14 to 22 only)

No (complete items 1 to 13 only)

The letters in parentheses correspond to the stage to which each item belongs to based on a factor analysis (see Franche *et al.*³⁹ for details). The acronyms are: Precontemplation (PC), Contemplation (C), Prepared for Action—Self-evaluative (PA-S), Prepared for Action—Behavioural (PA-B), Uncertain Maintenance (UM), and Proactive Maintenance (PM).

FOR THOSE NOT BACK AT WORK	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
(1) You don't think you will ever be able to go back to work. (PC)	1	2	3	4	5
(2) As far as you're concerned, there is no point in thinking about returning to work. (PC)	1	2	3	4	5
(3) You are actively doing things now to get back to work. (PA-B)	1	2	3	4	5
(4) Physically, you are starting to feel ready to go back to work. (PA-S)	1	2	3	4	5
(5) You have been increasing your activities at home in order to build up your strength to go back to work. (PA-B)	1	2	3	4	5
(6) You are getting help from others to return to work. (PA-B)	1	2	3	4	5
(7) You are not ready to go back to work. (PA-S)	1	2	3	4	5
(8) You have found strategies to make your work manageable so you can return to work. (PA-S)	1	2	3	4	5
(9) You have been wondering if there is something you could do to return to work. (C)	1	2	3	4	5
(10) You have a date for your first day back at work. (PA-S)	1	2	3	4	5
(11) You wish you had more ideas about how to get back to work. (C)	1	2	3	4	5
(12) You would like to have some advice about how to go back to work. (C)	1	2	3	4	5
(13) As far as you are concerned, you don't need to go back to work ever. (PC)	1	2	3	4	5
(14) You are doing everything you can to stay at work. (PM)	1	2	3	4	5
(15) You have learned different ways to cope with your pain so that you can stay at work. (PM)	1	2	3	4	5
(16) You are taking steps to prevent having to go off work again due to your injury. (PM)	1	2	3	4	5
(17) You have found strategies to make your work manageable so you can stay at work. (PM)	1	2	3	4	5
(18) You are back at work but not sure you can keep up the effort. (UM).	1	2	3	4	5
(19) You worry about having to stop working again due to your injury. (UM).	1	2	3	4	5
(20) You still find yourself struggling to stay at work due to the effects of your injury. (UM).	1	2	3	4	5
(21) You are back at work and it is going well. (UM).	1	2	3	4	5
(22) You feel you may need help in order to stay at work. (UM).	1	2	3	4	5

